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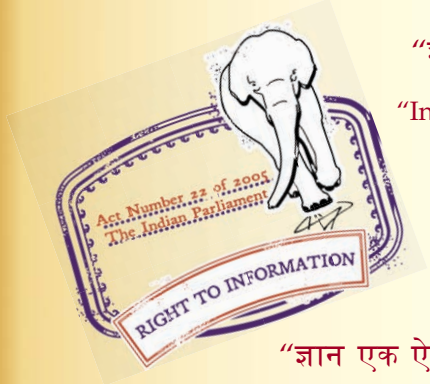


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"Knowledge is such a treasure which cannot be stolen"

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IS:6719-1972
( Reaffirmed 2002 )

# *Indian Standard*



# SPECIFICATION FOR SOLID PVC SOLES AND HEELS

( First Reprint JANUARY 1987 )

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 4

*February* 1973

# *Indian Standard*

# SPECIFICATION FOR SOLID PVC SOLES AND HEELS

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# *Indian Standard*

# SPECIFICATION FOR SOLID PVC SOLES AND HEELS

## 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 12 October 1972, after the draft finalized by the Footwear Sectional Committee had been approved by the Chemical Division Council.

**0.2** In this standard, the requirements for PVC soles and heels which are intended for the manufacture of footwear as well as repair of footwear have been specified. The design aspect of soles and heels and the composition of the PVC have been kept out of the specification, prescribing only the essential physical requirements. The sizes of soles and heels have also not been specified but it is hoped that helpful guidance will be drawn from IS:1638-1970* while deciding about the sizes.

**0.3** The Committee deleted the thermal stability test and in its place decided to include the blooming test and bleeding test when sufficient data is made available.

**0.4** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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## 1. SCOPE

**1.1** This standard prescribes the requirements and the methods of sampling and test for PVC full solid soles with or without heels, half soles and heels sold as finished products and manufactured by either direct injection or stuck-on process.

**1.1.1** This standard does not cover soles and heels for all PVC shoes.

**1.1.2** Top-lifts and ladies high heel unit sole are also not covered in this standard.

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*Specification for sizes and fittings of footwear (*first revision*).
†Rules for rounding off numerical values (*revised*).

## 2. TERMINOLOGY

**2.1** For the purpose of the standard, the definitions given in IS:2050-1967* and IS:1638-1970† shall apply.

## 3. REQUIREMENTS

**3.1 Material** — The materials used for soles and heels shall be compounded from PVC resin or blends with its copolymers. The resins would be compounded with suitable plasticizers and stabilisers.

**3.2** The soles and heels shall be cleated or non-cleated with stippled or other background pattern, as agreed to between the purchaser and the supplier.

**3.3** The provision for heels in the soles shall be optional and shall be subject to agreement between the purchaser and the supplier.

**3.4** The surface shall be free from blemishes and defects. All spew and moulding flashes shall be neatly trimmed from the PVC soles and heels so as to have clean edges.

**3.5** The size and thickness of the soles and heels shall be as agreed to between the purchaser and the supplier.

**3.5.1** The thickness at the waist or seat of full sole may be less than the thickness of the fore part by an amount not exceeding 1·5 mm subject to the thickness of waist and seat being not less than 1·5 mm.

**3.6 Physical Requirements** — The material shall comply with the physical requirements given in Table 1.

**TABLE 1 REQUIREMENTS FOR SOLID PVC SOLES AND HEELS**

| Sl No. | Characteristic | Requirement | Method of Test (Ref to Cl No. in Appendix A) |
|---|---|---|---|
| (1) | (2) | (3) | (4) |
| i) | Relative density, *Max* | 1·24 | A-1 |
| ii) | Tensile strength, kg/cm², *Min* | 65 | A-2 |
| iii) | Elongation at break, percent, *Min* | 230 | A-2 |
| iv) | Tear strength, kg thickness, *Min*: | | |
| | a) Fore part | 13 | A-3 |
| | b) Back part | 9 | |
| v) | Volatility, percent by mass, *Max* | 1 | A-4 |
| vi) | Lead (as Pb), ppm, *Max* | 2 | A-5 |

*Specification for sizes and fittings of footwear (*first revision*).
†Glossary of footwear terms.

**3.6.1** *Hardness* — The hardness of PVC soles and heels shall be within the range of 65 to 75 IRHD (International Rubber Hardness Degrees) when tested by the method prescribed under **A-6**. The tolerance on the agreed hardness within the range shall be ± 2.

## 4. MARKING AND PACKING

**4.1** Each sole and heel shall be indelibly marked with the name of the manufacturer or trade-mark, if any, size of the footwear for which it is intended and the type.

**4.2** The material shall be packed as agreed to between the purchaser and supplier. Each package shall contain soles and heels of one size only.

**4.2.1** The material may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 5. SAMPLING

**5.1** For the purpose of ascertaining the conformity of soles and heels in a consignment to this standard, the scale of sampling and criteria for conformity shall be as prescribed in Appendix B.

## 6. TEST METHOD

**6.1** Unless otherwise agreed to between the purchaser and the supplier, all tests shall be carried out within 3 months from the date of receipt of the material by the purchaser.

**6.2** Test pieces for relative density and hardness shall be prepared directly from the representative sample selected in accordance with **5.1.**

**6.2.1** For all other tests, test slab made of the same composition of the material and cured under identical conditions shall be supplied by the supplier.

NOTE — The supplier shall issue certificate to the effect that these slabs are made with the same composition and cured under technical identical condition.

**6.3** All physical and chemical tests shall be carried out as specified in col 4 of Table 1.

### 6.4 Measurement of Thickness

**6.4.1** *Full Soles* — Measure the thickness at any point along the edge of the sole excluding any raised or sunk pattern which covers a minor portion of the surface area of the fore-part or any thickening at the toe. Measure the substance from the top of the pattern with stippled or any other background pattern not exceeding 0·5 mm in depth.

**6.4.2** *Half Soles* — Measure the thickness at any point along the edge of the sole, excluding any raised or bevel at the waist or thickening at the toe. Measure the substance from the top of the pattern with stippled or any other background pattern not exceeding 0·5 mm in depth.

**6.4.3** *Heels* — Measure the substance at the back of the heel including any chevrons or protuberances at the point but excluding nail holes around and disregarding any recess on the reverse side of the heel.

## APPENDIX A

(*Table* 1)

## TEST METHODS FOR SOLID PVC SOLES AND HEELS

### A-1. DETERMINATION OF RELATIVE DENSITY

**A-1.1 Outline of the Method** — Relative density is determined by the hydrostatic method without the help of a sinker.

NOTE — The density of the material shall be taken to be numerically equal to its relative density and expressed in g/ml. The density of water at 27°C is taken as 1·00 g/ml.

### A-1.2 Apparatus

**A-1.2.1** *Balance* — weighing to 1 mg.

**A-1.2.2** *Balance Straddle* — A pan straddle of convenient size to support the beaker and permit determination of the weight of the test piece in water.

**A-1.2.3** *Beaker* — 250-ml capacity or smaller if necessary depending on the design of the balance.

**A-1.2.4** *Cooper Wire* — approximately 0·1 mm in diameter.

### A-1.3 Test Method

**A-1.3.1** *Preparation and Conditioning of Test Piece* — The test piece shall have a surface, free from crevices as far as possible, weighing at 5 g. The

test piece shall then be conditioned to a moisture equilibrium in an atmosphere of 65 ± 2 percent relative humidity and temperature 27 ± 2°C (*see* IS:196-1966*) for 24 hours prior to testing.

**A-1.4 Procedure** — Suspend the test piece from the hook on one side of the balance using a suitable length of wire, so that the bottom of the test piece does not touch the bottom of the beaker and weigh. Counter balance the wire previously by a length of wire on the other pan. Repeat the weighing with the test piece completely immersed in the freshly boiled and cooled distilled water to a temperature of 27 ± 2°C, in a beaker. Allow sufficient time for the test piece to attain the temperature of the water. Make sure that there are no air bubbles on the surface of the specimen and the wire while immersed in water.

**A-1.5 Calculation** — Calculate the relative density as follows:

$$\text{Relative density (27/27°C)} = \frac{M_1}{M_1 - M_2}$$

where

$M_1$ = mass in g of test piece in air, and

$M_2$ = mass in g of test piece in water.

## A-2. DETERMINATION OF TENSILE STRENGTH AND ELONGATION AT BREAK

### A-2.1 Apparatus

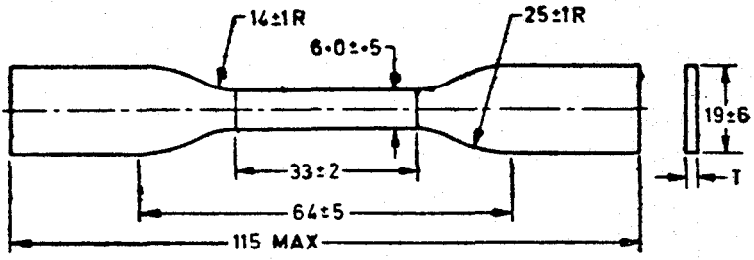
**A-2.1.1** *Tensile Test Machine* — Any suitable machine with a speed of 100 mm/min jaws separation and capable of applying breaking load up to 250 kg/cm².

**A-2.2 Test Piece** — The test piece of the forms and dimensions shown in Fig. 1 shall be cut out from the test slab supplied by the supplier (*see* **6.2.1**), using a single stroke of a press with an appropriately shaped knife-edged punch. The cutting edge of the knife shall be sharp and free from notches. Two parallel crayon lines, 33 ± 2 mm apart, shall be marked on the waisted part of each test piece as indicated in Fig. 1.

**A-2.3 Conditioning the Test Piece** — The test piece shall be conditioned to a temperature of 27 ± 2°C for 24 hours prior to test.

**A-2.4 Temperature of Test** — Carry out test at 27 ± 2°C unless otherwise specified.

*Atmospheric conditions for testing (*revised*).




All dimensions in millimetres.

FIG. 1 TENSION TEST SPECIMENS FOR SHEET, PLATES AND MOULDED PLASTICS

### A-2.5 Procedure

**A-2.5.1** Measure the thickness by a micrometer gauge. The width of the test portion is assumed to be equal to the width between the cutting edge of the narrow central part of the die; for this purpose, the width of this part of the die is measured to the nearest 0·5 mm. Take the average of three measurements, one in the centre and two on each side.

**A-2.5.2** Insert a double-bell test piece into the grips of the tensile testing machine taking care to adjust it symmetrically so that the tension will be distributed uniformly over the cross section. If tension is greater on one side of the test piece than on the other, the reference lines will not remain parallel and the maximum strength of the piece will not be developed.

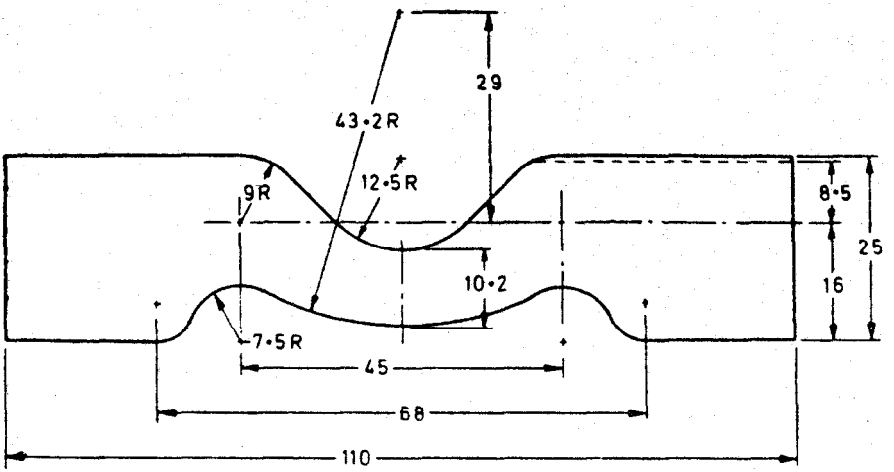
**A-2.5.3** Adjust the speed and start the machine. Measure the distance between the centres of reference lines as required to the nearest 1 mm taking care to avoid parallax, until the test piece breaks. Note the load on the test piece as required. Repeat the process with at least five specimens.

**A-2.5.4** When modulus values are required, attach the extension indicator. Set the speed of testing at 100 mm per minute and start the machine. Record loads and corresponding deformation at appropriate even intervals of stain. Record the load carried by the specimen when the stain reaches 0·02 and the elapsed time from the start of the test until this point is reached. If rupture occur before the stain reaches 0·2, record the elapsed time from the start of the test until the specimen breaks.

## A-3. DETERMINATION OF TEAR STRENGTH

### A-3.1 Apparatus

**A-3.1.1** *Press Knife* — A press knife which cuts out test pieces shown in Fig. 2 and slot in one operation.




All dimensions in millimetres.

FIG. 2 DIMENSIONS OF TEST PIECES

**A-3.1.2** *Micrometer Dial Gauge* — The instrument for measuring the thickness of tear test pieces shall consist of a micrometer dial gauge firmly held in a rigid stand over a flat base-plate of diameter at least 50 mm. The gauge shall have a scale graduated in unit divisions of 0·01 mm. The dial gauge shall be fitted with a flat contact, square to the plunger and parallel to the base plate, and shall operate with a pressure of 0·2 ± 0·03 bar.

NOTE — It is preferable for the gauge to have a contact area of diameter about 4 mm as this may be used on almost all test pieces without any subpart of the contact area over-hanging the test piece edge, which would increase the contact pressure.

**A-3.1.3** *Measuring Instrument* — For measuring the depth of the nick, an optical instrument shall be used, the test piece being mounted so that the nick is slightly opened in order to make it visible.

**A-3.1.3.1** When it is only necessary to check that the depth of the nick is within the specified limits, any suitable means may be used, for example, an optical projection apparatus. A convenient arrangement is a microscope giving about 100× magnification and fitted with travelling stage suitably illuminated. The eyepiece is fitted with a graticule by which to record the travel of the stage and test piece through a distance equal to the depth of the nick. The travel of the stage is calibrated with a stage micrometer graticule.

**A-3.1.3.2** Alternatively, a travelling microscope may be used. The apparatus shall show an accuracy of measurement of at least 0·025 mm.

**A-3.1.4** *Tensile Testing Machine* — The tensile testing machine shall be power-driven and of such capacity that the maximum force required for the test is not greater than 85 percent nor less than 15 percent of the maximum of the scale. The rate of traverse of the driven grip shall be 500 ± 50 mm per minute and the power shall be sufficient to maintain the rate substantially constant up to the maximum capacity of the machine. The machine shall be equipped to give a stretching of the test piece. After the test piece has broken, the indicators shall remain at the point of the maximum force. The machine shall be provided with a type of grip which tightens automatically as the tension increases and exerts a uniform pressure across the widened end of the test piece. Each grip shall incorporate a positioning device so that all test pieces are inserted to a depth of 15 to 20 mm and are in axial alignment with the direction of pull.

NOTE — The force scale shall be calibrated by a suitable method at least every six months to ensure that the error does not exceed 1·5 percent whichever is greater.

### A-3.2 Test Piece

**A-3.2.1** The test piece of the dimensions as shown in Fig. 1, shall be cut from the sheet by punching with a die using a single stroke of a press where the cut edge shall be normal to the surface. The thickness of the test piece shall be 2·0 ± 0·2 mm and shall be measured by means of a micrometer gauge specified in **A-3.1.2.** The thickness in the region of the test area shall nowhere deviate by more than ± 2 percent from the mean.

**A-3.2.2** A single nick or slit of 0·50 ± 0·08 mm shall be cut with extreme care and accuracy, symmetrically across the centre of the concave inner edge of the test piece. Test pieces falling out of the tolerance specified for the nick shall be discarded.

### A-3.3 Procedure

**A-3.3.1** Test at least three, preferably six test pieces.

**A-3.3.2** *Preparation of the Sample* — Buff as and when necessary the sample which is of uneven thickness, or of thickness above the maximum specified for the test piece which is to be cut from it. If, however, the resulting sample is less than 1 mm thick, it is unsuitable for testing. During buffing avoid undue heating.

**A-3.3.3** *Conditioning of Test Pieces* — Condition samples after necessary preparation at 27 ± 2°C and 65 ± 2 percent relative humidity for not less than 24 hours immediately before testing.

**A-3.3.4** *Nicking of Test Pieces* — Four measurements of thickness in the region of the test area shall be made and the average value shall be used in the formulae given in **A-4.4.1.**

NOTE — The depth of the nick on both sides of the test piece shall be measured and the average value calculated. Any test piece in which the depth of the nick on

either side is outside the limits stated above shall be discarded. The effective width of the test piece shall be taken as the minimum width of the die (10·5 mm) minus the average depth of the nick.

**A-3.3.5** *Determination of Tear Strength* — Insert the test piece in the grips of the tensile testing machine, taking care to adjust it symmetrically so that tearing shall proceed in a plane normal to the direction of pull. Then start the machine and do not stop until the test piece breaks. Note the maximum load reached during the tearing along with the average thickness of the specimen.

### A-3.4 Calculation

**A-3.4.1** The tear strength depends upon the width and thickness of the test piece, and the result is expressed as the force necessary to tear a test piece of standard width and thickness. The value is stated in units of force $F$.

$$F = \frac{L \times W_1 \times t_1}{W_2 \times t_2}$$

where

$L$ = breaking load in kg,
$W_1$ = effective width in mm of standard test piece (9·7 mm),
$t_1$ = thickness of standard test piece (2·5 mm),
$W_2$ = effective width in mm of actual test piece, and
$t_2$ = thickness of actual test piece in mm.

### A-3.5 Report

**A-3.5.1** The report shall state:

a) The tear strength, calculated as in **A-3.4.1**;
b) Direction in which test piece is cut relative to grain; and
c) Temperature of test, if other than 27 ± 2°C.

NOTE — Where grain direction is not known, the conclusion drawn will be erroneous.

**A-3.5.2** The result reported shall be the average of the middle two values, if an even number of test pieces is used, or the middle if an odd number is used, the various results being classified in order of increasing values. If only three test pieces are used, the individual results shall be reported.

## A-4. DETERMINATION OF VOLATILITY

### A-4.1 Apparatus

**A-4.1.1** *Oven* — A suitable oven with constant air circulation and capable of maintaining temperature at 130°C.

**A-4.1.2** *Desiccator*

**A-4.2 Test Pieces** — Disc of 57 mm diameter shall be cut from the sheet prepared as described in **6.2.1**. Condition the test piece for 24 hours at 27 ± 2°C and 65 ± 2 percent relative humidity.

**A-4.3 Procedure** — Weigh the test piece to the nearest 0·1 g in a dish. Heat it at 130°C for 3 hours in oven. Cool it in a desiccator and weigh. There shall be no discolouration at the end of the test.

**A-4.4 Calculation**

**A-4.4.1** Calculate the volatility as follows:

$$\text{Volatility, percent by mass} = \frac{M_1 - M_2}{M_1} \times 100$$

where

$M_1$ = original mass in g of the test piece, and
$M_2$ = mass in g of the test piece after heating.

## A-5. TEST FOR LEAD

### A-5.1 Apparatus

**A-5.1.1** *Nessler Cylinder* — 50 ml capacity.

### A-5.2 Reagents

**A-5.2.1** *p-Nitrophenol Indicator Solution* — Dissolve 0·29 g of *p*-nitrophenol in hot water and dilute to 100 ml.

**A-5.2.2** *Dilute Ammonium Hydroxide* — 1 : 9.

**A-5.2.3** *Dilute Hydrochloric Acid* — 1 : 99.

**A-5.2.4** *Hydrogen Sulphide Solution* — saturated and freshly prepared.

**A-5.2.5** *Standard Lead Solution* — Dissolve 1·60 g of lead nitrate in water and make up the solution to 1 000 ml with water. Pipette out 10 ml of the solution and dilute again to 1 000 ml with water. One millilitre of this solution contains 0·01 mg of lead (as Pb).

**A-5.3 Procedure** — Weight accurately 5 g of the material and thoroughly shake it with 25 ml of water for 5 minutes and filter. Take the filterate in a Nessler cylinder and add one drop of *p*-nitrophenol indicator solution. Add dilute ammonium hydroxide dropwise until the solution turns yellow. Add dilute hydrochloric acid dropwise until the solution becomes colourless and then add 0·5 ml of the acid in excess. Add 5 ml of hydrogen sulphide solution, dilute to the mark and mix well. Carry out a control test in a similar manner in another Nessler cylinder using 1 ml of standard lead solution.

**A-5.3.1** The limit prescribed in Table 1 shall be taken as not having been exceeded if the intensity of colour produced with the material is not greater than that produced in the control test.

## A-6. DETERMINATION OF HARDNESS

**A-6.1 Apparatus** — A suitable durometer capable of registering directly hardness ranging from 0 to 100 IRHD.

NOTE — Reading in IRHD are approximately the same as those of the Shore Durometer Type A.

**A-6.2 Test Piece** — The test piece shall have its upper and lower surface flat, smooth and parallel to one another, the thickness being at least 3 mm. The test piece shall be conditioned to a moisture equilibrium in an atmosphere of 65 ± 2 percent relative humidity and temperature 27 ± 2°C. (*see* IS : 196-1966*) for 24 hours prior to testing.

**A-6.3 Procedure** — The test piece, immediately after conditioning (*see* **A-2.1**) shall be laid on the steel anvil of the durometer. The plunger shall be pressed vertically under a load of 1 000 g to the test piece. Maintain the pressure for 5 seconds and note the reading on the scale. Take measurements on six points on each side of the test piece, taking care that no two points on the same side are within 10 mm.

**A-6.4 Reporting of Result** — The arithmetic mean of the hardness numbers obtained shall be reported as the hardness of the test piece.

# APPENDIX B

(*Clause* 5.1)

## SCALE OF SAMPLING OF SOLID PVC SOLES AND HEELS

### B-1. LOT

**B-1.1** All PVC soles or heels in a consignment, having the same design and dimensions, belonging to the same batch of manufacture and made of similar PVC mix and type shall be grouped together to form a lot. The maximum lot size shall be approximately 5 000 pairs.

**B-1.2** Samples shall be selected and examined from each lot separately for ascertaining the conformity of the material to the requirements of this specification.

*Atmospheric conditions for testing (*revised*).

## B-2. SCALE OF SAMPLING

**B-2.1** The number of PVC soles or heels to be selected from any lot depends on the size of the lot and shall be in accordance with col 1 and 2 of Table 2.

TABLE 2 SCALE OF SAMPLING FOR DIFFERENT TESTS

| No. of Soles or Heels in the Lot (In Pairs) | Visual and Dimensional Characteristics | | Number of Physical Tests for Each Characteristic |
|---|---|---|---|
| | Sample Size (In Pairs) | Acceptance No. | |
| (1) | (2) | (3) | (4) |
| Up to 500 | 8 | 0 | 2 |
| 501 „ 1 000 | 13 | 1 | 3 |
| 1 001 „ 3 000 | 20 | 1 | 4 |
| 3 001 „ 5 000 | 32 | 2 | 5 |

**B-2.2** The soles or heels shall be selected at random from the lot. For random selection procedures guidance may be had from IS : 4905-1968*.

## B-3. CRITERIA FOR CONFORMITY

**B-3.1** All the soles or heels drawn under **B-2.1** shall be subject to visual examination for the material (**3.1.1**, **3.1.2** and **3.4**) and dimensional checks (**3.5**). The number of defective pairs under each of the above two categories of tests shall not exceed the acceptance number given in col 3 of the Table 2 if the lot is to be accepted under this clause.

**B-3.2 Physical Tests** — Only if the lot passes the tests under **B-4.1**, it should be tested for physical characteristics. The number of sample pieces to be selected for this purpose depends on the number of tests to be conducted as indicated in col 4 of Table 2. The test pieces shall be prepared as described in **6.2**. The lot shall be accepted under the clause only if all the test results satisfy the corresponding requirements prescribed in Table 1.

*Methods of random sampling.

**INDIAN STANDARDS**

**ON**

**FOOTWEAR AND FOOTWEAR AUXILIARIES**

IS:

576-1954 Glazed kid for shoe uppers

578-1964 Full-chrome upper leather ( *revised* )

579-1962 Sole leather ( *revised* )

583-1969 Ankle boots for general purposes ( *first revision* )

584-1964 Chaplis, frontier pattern for general purposes ( *revised* )

622-1956 Russet leather

1636-1960 Chrome waxed shoe leather

1638-1969 Sizes and fitting of footwear ( *first revision* )

1989-1967 Miners' safety leather boots and shoes ( *first revision* )

2050-1967 Glossary of footwear terms

2051-1962 Methods for sampling of leather footwear

2060-1962 Gents' leather shoes

2276-1962 Vegetable and aluminium tanned snakeskins

2545-1963 Vegetable tanned lizardskins

2961-1964 Chrome retan upper leather

3297-1965 Water-resistant vegetable tanned sole leather

3735-1966 Canvas shoes, rubber sole

3736-1966 Canvas boots, rubber sole

3737-1966 Leather safety boots for workers in heavy metal industry

3738-1966 Rubber knee boots

3840-1966 Lining leather

3976-1967 Safety rubber-canvas boots for miners

4128-1967 Fireman's leather boots

4512-1967 Footwear lasts, wooden

4585-1968 Football boots

5259-1969 Girls' and maids' school shoes

5332-1969 Boys' and youths' school shoes

5333-1969 Leather cricket boots

5520-1969 Wooden lasts for heavy-duty boots

5676-1970 Moulded solid rubber soles and heels

5689-1970 Ankle derby boots

5852-1970 Protective steel toe caps for footwear

5853-1970 Open-toe wedge sandal for nurses

5865-1970 Wooden heels for women's and girls' footwear

6053 ( Part I )-1970 Hand tools for footwear industry: Part I Upper clicking knife

6053 ( Part II )-1971 Hand tools for footwear industry: Part II Bottom cutting knife (*RAMPI*)

6053 ( Part III )-1971 Hand tools for footwear industry: Part III Designers knife

6053 ( Part IV )-1972 Hand tools for footwear industry: Part IV Half round knife

6368-1971 Methods for sampling of rubber and rubber combination footwear

6479-1972 Shoes for nurses

6493-1972 Sandals for men

6502-1971 Size stick for footwear industry

6519-1971 Code of practice for selection, care and repair of safety footwear

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